THERMAX

THERMOPAC ULTRA

Heating Business

Improving your business is our business

Thermax is an engineering major providing sustainable solutions in the areas of energy and environment. Spanning over 86 countries, clients make use of Thermax's business-to-business solutions for heating, cooling, power and cogeneration plants; waste heat recovery units; systems for water & wastewater management and air pollution control; performance improving chemicals.

Thermax's operations are supported by ongoing Research & Development, tie-ups with global technology majors, an international sales & service network spread over 27 countries and state-of-the-art manufacturing facilities in 14 locations including India, Indonesia, China, Poland, Denmark and Germany.

As a part of Thermax, Heating business - a strategic business unit offers packaged boilers, thermal oil heaters, waste heat recovery boilers, hot water and air generators. These are available in modular construction as a standard package configuration or a custom design for specific requirements. Innovated by a strong R&D that focuses on customer applications, we offer a range of heating systems designed to combust wide range of solid, oil & gas fuels including biomass and heavy liquid fuels. Heating SBU helps small and medium firms & fortune 500 companies to reduce energy cost with a worldwide presence of oil & gas based systems in Middle East and Europe, biomass and solid fuel fired equipment in South East Asia and Africa.

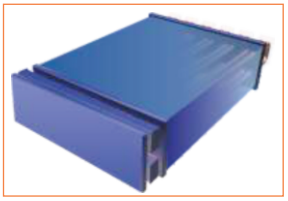
Thermax presents Thermopac-Ultra : the most efficient solid fuel thermal oil heater yet.
The incorporation of a technology breakthrough, in the form of 'inbed heat recovery', makes this thermal oil heater simply outstanding in its class.
The heat recovery thus achieved brings phenomenal advantages as listed alongside.

Advantages

- Highest efficiency - 80 %
- Decrease in power consumption - by 40%
- Reduced footprint area - by 25%
- Multi-fuel capability

Highest Efficiency - 80 %

Thermopac Ultra uses cooling coils in the combustor to extract heat and maintain bed temperature. This heat is then transferred to the thermic fluid in a state-of-the-art heat exchanger. This boosts efficiency to an outstanding 80%.

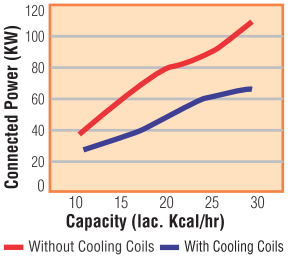


The Fluidised Bed Advantage

Automatic, mechanised fuel feeding ensures consistent performance in the form of temperature and heat output. Also, the high turbulence of the bed facilitates quicker responses to changes in demand.

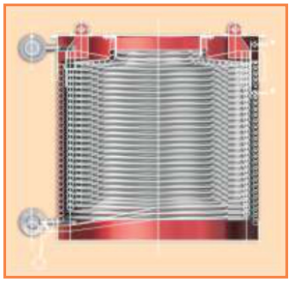
Lowest Power Cost

Heat extraction from the combustor, by the cooling coils, reduces excess air requirement for combustion and bed temperature control.
This reduced air requirement leads to lesser handling of air which, in turn, provides the advantage of reduced power consumption.



Composite Coil Design

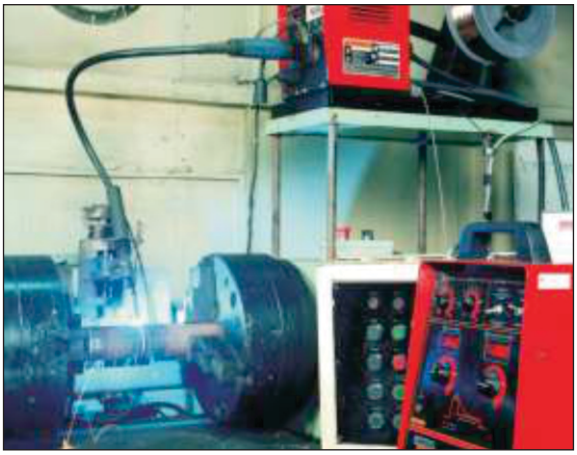
The coil has the unique advantage of a combined radiant and convective coil with online soot blower.
It is of single pass design, with a forced circulation, parallel flow on the thermic fluid side.
This leads to the advantage of lesser coil choking and a reduced footprint.



Quality Through Manufacturing Excellence

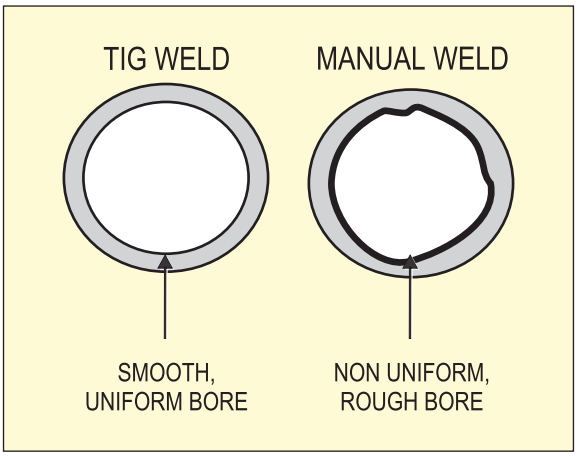
Thermax uses high quality standards and best manufacturing practices which are recognised by international agencies like ASME, TUV, Lloyd's etc

Manufacturing Excellence

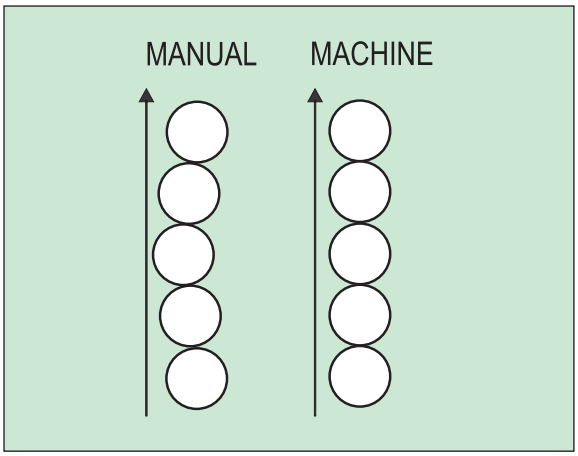


Fully automated tube to tube TIG Welding Machine

CNC coil winding machine



TIG Welding enables smooth uniform bore



SPM Winding ensures proper alignment, avoiding possibility of hot spots

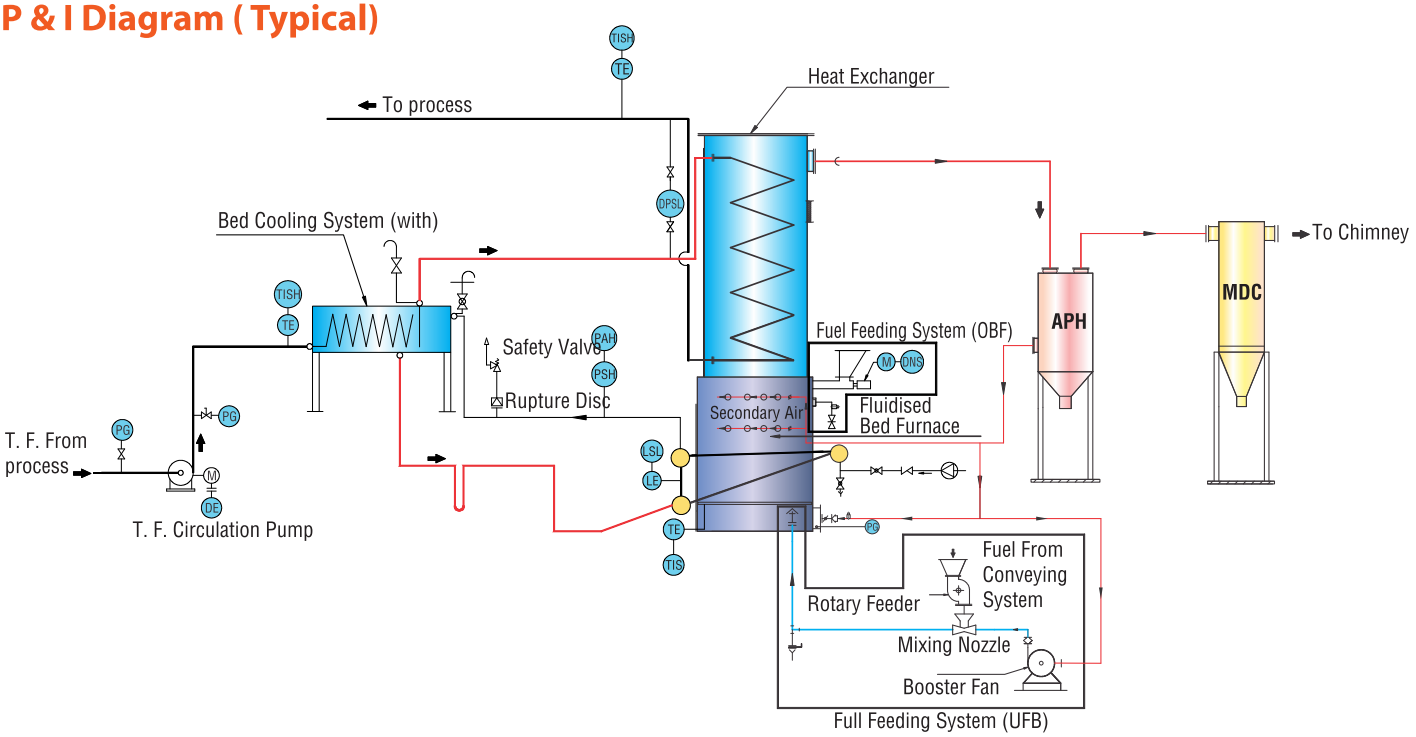
Operating Cost Advantage

	Thermopac Ultra FBC	Thermal Oil Heater Conventional FBC	Thermal Oil Heater Manual Fired
Heat Output	20,00,000 Kcal/ hr.	20,00,000 Kcal/ hr.	20,00,000 Kcal/ hr.
Thermal Efficiency - Coal	80%	73%	74%
Fuel Consumption coal (3500 Kcal/kg GCV)	714 kg/hr.	783 kg/hr.	772 kg/hr.
Annual Fuel cost	113.1 Lac (Rs.)	125.28 Lac (Rs.)	122.26 Lac (Rs.)
Connected Power	48.7 KW	78.4 KW	43.1 KW
Annual Power Cost	11.57 Lac (Rs.)	18.82 Lac (Rs.)	10.24 Lac (Rs.)
Man Power Required (2 shift operation)	2 Operators, 2 Fireman, 4 Casuals	2 Operators, 2 Fireman, 4 Casuals	2 Operators, 4 Fireman, 8 Casuals
Annual Man Power Cost	2.4 Lac (Rs.)	2.4 Lac (Rs.)	4.08 Lac (Rs.)
Total Operating Cost	127.28 Lac (Rs.)	146.5. Lac (Rs.)	136.58 Lac (Rs.)
Net Competitive Advantage Operating Cost		**19.22 Lac (Rs.)**	**9.3 Lac (Rs.)**

ASSUMPTIONS

No. of hours of operation per day - 16, No. of days per year - 330, Cost of coal - Rs. 3.00/kg, Cost of power-Rs. 4.50/kw, Operator's monthly salary-Rs. 5,000, Fireman's monthly salary -Rs. 3,000, Casual labour monthly salary - Rs. 2,000

P & I Diagram (Typical)



Technical Specifications

Description	Units	VTIF 10	VTIF 15	VTIF 20	VTIF 25	VTIF 30	VTIF 40
Heater Performance							
Heat Load	kcal/hr	10,00,000	15,00,000	20,00,000	25,00,000	30,00,000	40,00,000
Maximum outlet temperature	℃	280	280	280	280	280	280
(Thermic Fluid)							
Thermal Oil Flow	m3/hr	60	90	120	150	180	240
Circuit pressure	mlc	25	25	25	25	25	25
Efficiency*							
Coal	%	82	82	82	82	82	82
Husk	%	81	81	81	81	81	81
Imported coal	%	83	83	83	83	83	83
Thermic Fluid Temp. Rise	℃	34	34	34	34	34	34
Fuel consumption**							
Coal	kg/hr	284	425	567	709	851	1163
Husk	kg/hr	426	639	851	1064	1277	1582
Imported Coal	kg/hr	215	323	430	538	645	882
Connected Load							
Husk/ Coal (with MDC***)	kw	28.5	38.3	52.8	60.3	68.3	105.34
Imported Coal (with MDC)	kw	35.5	45.6	61.7	69.2	77.2	116.74
Husk/ Coal (with Cyclomax)	kw	32.2	45.0	60.3	67.1	75.3	116.84
Imported Coal (with Cyclomax)	kw	39.2	52.9	69.2	76.2	84.2	128.24

Note : *As per BS 845 Part 1 method. **Fuel consumption is based on net calorific value (NCV) of coal: 4,300 Kcal/kg, Husk : 3,200 Kcal/kg and Imported Coal : 5,600 Kcal/kg. ***Mechanical Dust Collector

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Thermax Business Portfolio

- Heating
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- Chemicals
- Water and Wastewater Solutions
- Solar
- Specialised Services